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ABSTRACT

The purpose of this study was to produce a list of materials for metric instruction in the elementary school. The Charles H. Taylor School in Boston was used as a laboratory for the collection, study, and evaluation of published metric materials. Problems inherent in the introduction of the metric system in four dissimilar elementary schools were studied. The main concerns focused on staff training and conversions, pupil incentives, and community/parental support and involvement. A primary administrative concern is that of finding money to purchase texts and materials for metrication. This paper describes the preliminary steps involving suppliers, staff, community, and school personnel, as well as procedures involving faculty and students for evaluating materials and programs. The paper includes a recommended list of the metric materials and aids judged to be most worthwhile for use in the elementary school. It was also recommended that a faculty review and use the materials before ordering them; that materials be learner-tested; that resource rooms to established and materials be shared to reduce costs; and that descriptive cost-analysis lists be distributed to assist in the purchase of cost-effective metric materials. (JBW)

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AN EFFORT TO PRODUCE A RECOMMENDED LIST OF ELEMENTARY METRIC MATERIALS

MAYI - II REPORT

CATHERINE M. MANEY
BOSTON CLUSTER

SE 020 271

F O R E W O R D

I wish to express my sincere gratitude and indebtedness to the teachers, specialists, parents, and custodians for their interest, help, and initiative which have made this Maxi II possible. I am also grateful to the observers who have given me so much help and encouragement: Dr. Alan Ellis, Mr. John J. Kelly, my Associate Superintendent, and Mr. Rollins Griffith, my Area Superintendent.

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AN EFFORT TO PRODUCE
A RECOMMENDED LIST OF
ELEMENTARY METRIC MATERIALS

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Submitted in partial fulfillment of the
requirement for the degree of
Doctor of Education, Nova University

Boston Cluster
Dr. Robert Peebles, Coordinator

Maxi II Practicum Report
September 1, 1975

ABSTRACT

The purpose of the practicum was to establish an inventory of published materials designed to teach metrication in the elementary school and to make the Charles H. Taylor School a laboratory for the collection, study and evaluation of these items. The administrator had to persuade educational suppliers of the soundness of this proposal and of the necessity for a trial run which would produce a recommended list of texts and equipment which could be purchased within the limits of restricted school budgets. The entire staff and student body were involved in the project. The resultant list and the cost analysis of the items has been used and requested in the city and in the state. At the conclusion of the project the staff requested that the inventory and laboratory setup be continued for other materials.

INTRODUCTION

During the 1973 - 1974 school year four members of the Boston Cluster worked together to study the problems inherent in the introduction of the Metric System in four dissimilar elementary schools. Months of research and study indicated that there were many issues which the administrator would have to solve; e.g., retraining of the staff, search for and selection of materials to be used, involvement of students, parents, and community, coordination of support services, and methods and techniques that might be successful in stimulating staff interest in the teaching of metrics.

As the project developed the main concerns of the four Nova participants centered on staff training and conversion, pupil incentives and community/parental support and involvement. These three topics required all the administrative expertise of the four experienced principals to develop workable strategies and to initiate action programs.

During the Month of May 1974 the four schools introduced the Metric System in every classroom in every nook and corner of each building and its environs. SI was a visible reality in Cambridge, Dorchester, Mattapan and Winchester. The four

principals served as a coordinating council to plan workshops to share information and to develop behavioral objectives.

An effort was made by the Metric Study Group to collect, study, and critique existing mathematics texts and supplementary materials to determine how much material was available for students and teachers. Due to the reluctance of the general public and the text book publishers to realize that the Metric System would become a definite, permanent part of the educational process, there were relatively few texts, workbooks, or A. V. materials which contained any metric information. Texts for primary grades contained no mention of metrics, and those written for grades four to six confined metric information to measurement tables found at the back of the book.

INTRODUCTION-SUMMARIZATION

Contacts were made with publishing companies to request available materials. Most companies had no metric materials, others stated that new editions were being prepared which would include the Metric System. A study was made of the few existing materials and an analysis of these materials has been included in this paper. Many new materials were beginning to appear on the market as the Metric Study Group was completing its work. Naturally each supplier provided the prospective purchaser with an attractive description of his product but there was no indication of a field trial in classrooms. Most materials appeared to be prohibitively high for an already overburdened school budget. The inevitability of the introduction of SI emphasized the need for a study and examination of metric materials to determine those which would be the most effective in the classroom and within the confines of a budget already severely limited by constant increases in price. Thus, the problems encountered in a Maxi I led to the decision to continue the search and research of materials especially since one of the objectives of Maxi I was that "The Task Force - - - - - will collect, study, and evaluate metric materials extant and appearing on the horizon."

STATEMENT OF THE PROBLEM

The administrative problems implicit in the forthcoming introduction of metrication in the elementary school are numerous but one of the most important is the budgetary concern of finding the money to purchase the necessary texts and materials for the changeover from the English system to SI. Since the expense of converting to metric will be prohibitive, and since no school system in Metropolitan Boston or in Massachusetts is actively engaged in the teaching of metrics, there are no recommended lists of texts, workbooks, or audio-visuals. Therefore, the selection of materials presents a definite challenge. The customary procedure of ordering after a cursory glance at samples must be abandoned. A system must be developed whereby a school, such as the Charles H. Taylor, may have the opportunity to use and evaluate materials, to analyze their value in relation to the cost and, thereby, eliminate the purchase of useless products which remain on shelves or in closets gathering dust. During current financial crises with less money and constantly increasing costs, the administrator's concern with worthwhile educational purchases is heightened.

PURPOSE OF THE STUDY

To determine what can be done in a positive and productive way in a laboratory setting to produce an inventory of cost analyzed materials to introduce metrication in the elementary school.

OBJECTIVES

1. Preliminary contacts with publishers and educational suppliers will result in their willingness to contribute items for teacher/student evaluation.
2. An inventory of numerous appropriate texts, workbooks, audio-visuals and films will be established in the Taylor School.
3. Teachers, after trial runs with many metric materials, will realize the value of a laboratory approach to the selection of materials.
4. Informative meetings and bulletins will acquaint parents and community people with the value of trial runs with new materials to assure the purchase of appropriate materials at the lowest cost possible.
5. The skills and techniques developed as a consequence of the evaluation and cost analysis of the inventory of metric materials will be applied by the teachers in the selection of future purchases.
6. One outgrowth of this project will be a recommended list of the most productive, worthwhile metric teaching materials and aids for

use in and outside the city.

7. Through the interest of the Area Superintendent and the Associate Superintendent the aforementioned list and a cost analysis of each item will be disseminated to all elementary schools in the area and in the city.
8. Nova Participants in the Massachusetts and Rhode Island areas, who have requested help on staff training in metrication, will request the recommended list and the cost analysis of the items.
9. Producers of educational materials will continue to supply the Taylor School with educational items to be tried before purchase.
10. Criteria will be set up to determine the quality of metric educational items inventoried and evaluated.

PRELIMINARY STEPS

Educational Suppliers

The first major administrative problem to be met was the one involving educational suppliers. It is customary to ask for and to receive a sample copy of a text and the teacher's edition. Usually schools do not receive filmstrips or cassettes to use and evaluate. To persuade companies to provide enough copies of textbooks and workbooks for a class of twenty-five to thirty requires considerable expertise. Twenty-five years as an administrator, fifteen of them as a principal, gave certain priorities with salesmen and company executives who had formerly been salesmen.
An explanation of the experiment was required. Companies which had used learned-verified procedures and those who had not were willing to cooperate in the project. At this point it is necessary to differentiate between programs which have been tried in schools and those which have been developed by "experts" in the field or by consultants who have had no experience in the classroom. Since this administrator developed a Reading Program for the City of Boston under the auspices of the

Ford Foundation, Action for Boston Community Development, and the Office of Economic Opportunity, there was a possibility that the administrator had a knowledge of the methods and techniques needed in the selection of the appropriate materials necessary to teach metrication. As a result of involvement in the aforementioned two-year released program as Coordinator for the three agencies where it was necessary to live within a budget, yet determine the best materials cost-wise, which could be ordered for the sixteen schools involved in the program, the administrator had to become knowledgeable about purchasing and budgeting. The expertise developed as coordinator would be utilized in obtaining cooperation from the publishers and the suppliers of educational materials.

Letters were written to all textbook publishers, to audio-visual companies, and to all firms which supplied teaching materials. Contacts were made by the administrator with all area salesmen of the various companies.

Letters, notes, and telephone calls resulted in visits and conferences with many publishers who would provide materials for the Taylor School. As a consequence of these communications with the

various suppliers, agreements were made to furnish the Taylor with textbooks, workbooks, filmstrips, cassettes, manipulative kits, duplicating masters, and transparencies.

The Cambridge Book Company decided to have the school do a Pilot Program on its new 1975 Cambridge Mathematics Teach-a-Text Kindergarten through Grade 5 and supplied thirty copies of the pupil text and one copy of the teacher's manual per grade level. Holt, Rinehart and Winston, Inc. and Science Research Associates followed the same pattern. The project was ready to start. Other materials arrived by mail or were hand delivered during the Month of October. Whenever new titles appeared in educational magazines or catalogues, a request was made to examine and use these items. Thus, there was a continuous search to obtain new metric teaching products for the inventory.

Staff Involvement

The second administrative problem to be surmounted was to explain the proposed experiment to the staff and to seek their cooperation in participating in the project. During the first staff meeting of the 1974 - 1975 year part of the discussion centered on the continuation of the Metric System as a

learning experience and the lack of available teaching "tools" during the Metric Immersion Month in May, 1974.

The administrator introduced the problem of ordering instructional materials which would be worthwhile, appropriate, would satisfy both the needs of the students and the teacher, and which would be within the budgetary limits of the school. Due to increased costs of transportation, changes in prices after materials have been ordered, and textbooks which must be ordered for the new reading program, budget amounts allotted to each teacher would be limited. Customary ordering procedures in Boston involve teacher attendance at exhibits where educational suppliers display teaching/learning materials for teachers to "examine." Teachers order books, kits and filmstrips which they think will be useful in their classrooms. After delivery and subsequent trial in their classes, at least one-half of the educational materials ordered remains on storeroom shelves because teachers found that these articles did not fulfill the manufacturer's or publisher's promises.

To prevent waste of this nature, the school would request textbooks, workbooks, filmstrips, cassettes,

and films from the various companies and establish an inventory in the school. All teachers would use the materials suitable for their classrooms and would give evaluations of the items used. Each classroom would become a laboratory to try out texts, workbooks, and so on before ordering. Teachers would work together to analyze the cost of each item versus its effectiveness in the teaching/learning situation.

Having considered the experiment from all angles, the staff agreed to participate. The faculty stated its belief that there should be a better method of reviewing, selecting, and purchasing texts and audio-visuals than the one presently used. Committees were to be formed by grades with a grade chairman for each level. The administrator chose the general chairman, a math specialist who was most interested in S. I., and who had organized and trained classes for the Metrathon and all competitive field events using the Metric System in May, 1974. The general chairman would list all materials as they were received, would distribute the lists to the teachers, and would be responsible for the total inventory and distribution of all items to individual teachers.

Grade Committees were to meet within two weeks to determine the criteria to be used to evaluate and select metric materials to be purchased Grade Chairmen, the general chairman, and the principal would meet within one week to exchange ideas on evaluation models to be developed for teachers. As far as the staff was concerned, the experiment was off to a good start.

Community Involvement

The Advisory Council and the Home and School Association were informed of the projected experiment. Their enthusiasm for the idea was most welcome. Since the participation of the council and the association had provided resources and materials used in developing a model for teaching metrication in 1974, it was essential to the success of the new project that both groups be informed and included . Plans would be made to show and demonstrate to them items included in the inventory.

School Personnel

The final step was to inform the Area Superintendent that the Taylor would continue to teach metrication. Permission had been granted the previous

year for the Taylor an d the Marshall to do a Pilot Program in S. I. The new experiment was explained both to the Area Superintendent and to the Associate Superintendent in Change of Curriculum. The experiment was approved by both superintendents. As a matter of Policy, the Curriculum and Supervision Departments were notified of the experiment. Their approbation was not needed but their assistance in notifying the school of new materials which they discovered would be appreciated.

PROCEDURES

Faculty Meetings

The first major step taken by the faculty was to develop the criteria which were to be used in the study, examination, and evaluation of the metric educational items submitted to the school. The administrator attended these meetings to explain and review the model for teaching metrication which had been produced the previous year by the four schools involved in the project "An Effort To Introduce Metrication In The Elementary School." This project, of course, included the Charles H. Taylor School and its faculty. The objectives of the model were studied and since the Taylor was using the pattern, it was determined that the criteria should be based on the model and its objectives. Further meetings were necessary in order to formulate the desired criteria.

Faculty Committees

The arrival of numerous metric educational materials demonstrated the need of preparing uniform evaluation sheets for teachers to use and so the Faculty Committees tackled this problem. The Grade Committees

met separately, then together, to prepare the evaluation form. When the tentative form had been agreed upon the grade chairmen met with the general chairman and the principal.

The ideas and opinions of each committee were presented by the chairman to the group for discussion. The format for the evaluation forms was agreed upon. At this time the group offered the suggestion that evaluation pertaining to children or emanating from children would be valuable. Additional meetings were scheduled to produce an assessment sheet on which the teacher would record the child's reaction and a second form on which the older student could register his reaction.

Faculty Productivity

At the end of October as a result of much planning and many meetings, the faculty presented its final reports on the criteria to be used in determining the most appropriate metric materials and the evaluation forms. After some discussion with the principal and the general chairman, the entire package was accepted. Each teacher would check off the criteria and evaluation forms

for all items used in the experiment. These would then be discussed with the various chairmen. The inclusion of the students in the evaluation plan proved to be an excellent idea. Students' ideas in many instances were different than those of the teachers and provoked deeper thought on the part of the faculty. In addition students were happy to find that we respected their judgment.

Criteria

1. Introductory metric experiences for the young should be life-related experiences.
2. Reinforcement should provide a wealth of actual measurement exercises - commonly called "hands on" activities.
3. Materials should familiarize students with the nomenclature and skills required to make effective use of the metric system at their age and educational level.
4. Evidence should be provided that the metric educational products or materials have been "learner-verified."
5. Conversion from the English to the metric system should not be accepted.
6. Authors and consultants involved in the development of metric materials should

have had experience in teaching or working with teachers on the elementary level and should be well versed in metric usage.

7. Information presented should be simple, clear, direct and correct.
8. Student should be motivated to become actively involved in the metric program through the materials presented.
9. Metric materials should permit the student to become familiar with the single metric measurement being taught before being exposed to multiples and sub-multiples of the unit.
10. Educational products should provide many experiences in estimating in metric measurement.

Evaluation

A. Teacher Evaluation

Name:

School:

Grade:

Product:

Author:

Company:

1. Presentation
2. Clarity

3. Freedom from error
4. Stimulating approach
5. Grade level
6. Interest level
7. Type of paper
8. Print - type and size
9. Filmstrip or film - clear
10. Illustrations:
    a. Pertinent
    b. Distracting
    c. Attention getting
    d. Exaggerated
    e. Overdrawn
11. Program -
    a. Individualized
    b. Upper level
    c. Average
    d. Low
    e. General use
12. Kits -
    Material included -
    Manipulative
13. Would you like to have this material?

B. Students' Reaction (as observed by the teacher)

1. Name

2. School

3. Grade

Product

Author

Company

Observation by teacher

1. Interest

2. Cognitive skills gained

3. Affective skills

4. Objectives achieved

C. Student's Reaction

Student's Name

School

Grade

Product

Author

Company

Did you like the film?

filmstrip?

kit?

book?

workbook?

Why?

Did you like the illustrations?

Why?

Would you like to use this material?

Did it help you?

INVENTORY

By mid-January the Taylor Inventory had many books, workbooks, and audio-visuals of various types. Greater impetus and more meaning was given to the laboratory experiment with the publication of an article in January, 1975 entitled "How To Tell Whether Your Schools Are Being Gypped." The article quotes P. Kenneth Komoski, executive director of EPIE as saying that "an estimated 99 percent of all instructional materials being sold to schools by the education industry have never been systematically tested with children and then revised and improved on the basis of that teaching." [1.] Mr. Komoski also states that any curriculum materials "must be selected to fit specific instructional requirements." [2.] An urban setting may demand different materials than a suburb.

Upon request the general chairman catalogued all metric items by type and delivered new lists to the teachers. Each grade level selected a number

1. The American School Board Journal, January, 1975, Vol. 162 No. 1 "How To Tell Whether Your Schools Are Being Gypped" P. 38

2. Ibid P. 40

of items to investigate. This meant, for example that the teachers in Grade Two would look for the publisher's releases and descriptions of his products and examine the background of the authors or consultants involved in the development of the item being studied. The faculty met regularly to share this type of information as well as to discuss their opinions of the many metric materials which they were using. The Inventory contained the following items:

10 metric kits

23 sets of cassettes and filmstrips

4 sets of cassettes and worksheets

10 sets of duplicating masters

17 math textbooks and workbooks from 17 different companies - (complete sets from a company, one per grade; complete sets for one grade).

8 worktexts - (not part of any math system).

Examination of the items submitted for laboratory use in the school quickly revealed that so far there are only two science series which refer to and use the metric system. The 1975 edition of Understanding Your Environment, Mallinson et al,

published by Silver Burdett Company contains references to metric measurement. Distance and temperature are recorded in metric - meters and celsius. The other science series is the new 1975 edition of Houghton-Mifflin, Modular Activities Program in Science. In this series food intake and food weight are given in grams, distance is recorded in meters, and circumference in kilometers. Ten months of searching found no other textbook, nor were there any audio-visuals.

Publishers of elementary materials have concentrated on the introduction of the metric system in their new mathematics texts and workbooks and have not concerned themselves about other subjects. One set of duplicating masters, The Metric Packet of Comprehend, Compute and Learn published by Christopher Lee Publications, consists of twenty-five pages of Metric System Story Problems. These problems deal with social studies, science, cars, planes, and the human body. However, other than the textbook named, there are no texts which make a point of using S. I. to express distance, weight, or temperature.

Elementary Home Economics and Industrial Arts teachers showed their ingenuity in introducing metrication in their classrooms. Newspapers, magazines, the Metric Journal, the Arithmetic Teacher, The Grade Teacher, educational and other magazines produced for the elementary level were used to obtain examples of the metric system as related to these two subjects.

The educational materials in the inventory were circulated so that all teachers had the opportunity to see and examine the items applicable to their levels. The audio-visuals were used by each faculty member to determine the proper grade and interest level.

Salesmen who brought in new materials visited classrooms to observe the filmstrips and listen to the cassettes with which they were not familiar. Offers were made by some companies to send their consultants to demonstrate the product and to receive comments from the teachers. The faculty and principal welcomed these visits because they provided feedback on the objectives, contents, and results of the metric item. The "pilot studies" were the most profitable because classes in sequential order were provided with texts and workbooks so that an opinion

could be formed on the total program according to the results obtained at each grade level. Months of use in the classroom laboratory and hours of discussion and examination resulted in descriptive analyses of the items in the inventory and definite, valuable opinions of the product itself. Following the descriptive analysis of each highly rated product, a cost analysis was completed by the several grade levels with the aid of the administrator.

Descriptive Analysis

Items in the inventory were classified by type and not according to the order in which they were received or used.

Manipulative Kits

Teachers placed a high priority on manipulative materials. Beginning with Dewey and his contemporaries, educators have emphasized that activity is an essential part of learning. Today's experts in the mathematics field assert that children learn to measure only by measuring. The kits provided the necessary materials for "hands-on" metric experiences.

Addison Wesley produced two metric kits: Metric Kit A for primary and Metric Kit B for elementary. Each kit contains the concrete manipulatives required for teaching measurement in metric units. Although this company does have its own math system, the kits can be used independently with any system. Both kits contain items necessary to understand metric units of length, volume and temperature.

Each kit costs $69.95 and is rated very good by the faculty and children.

The Cuisenaire Company of America, Inc., produced kits called Working With Color Rods in Metric Measurement, authored by Joseph P. Cech and Carl H. Seltzer. There are three kits:

Unit I Metric Length - consisting of 16 lessons, 20 ditto masters, and a teacher's guide.

Unit II Metric Area - consisting of 16 lessons, 16 ditto masters, and a teacher's guide.

Unit III Metric Volume - consisting of 9 lessons and 12 ditto masters. These lessons do not provide a complete program; they do provide physical models which help the student to understand the metric system. The lessons are designed to be used as supplemental material with any textbook.

Since the lessons are developmental, they should be used in order. The lessons and the rods are good for individualized learning or small group work.

Units I and II cost $6.50 each, Unit III costs $5.50. Cuisenaire rods for three students cost $7.95. Rated excellent by faculty and children.

Among other kits used were the three Metric Multimedia Kits assembled by Weber and Costello for the Educational Teaching Aids Company. Once again the kits met our criteria on every point and especially point 2 concerning an activity program and point 9 in that only one form of measurement is presented at a time. Kit A teaches length and area, Kit B weight, and Kit C liquid volume. The cost per kit is $14.95 or the three kits may be purchased for $42.50.

Each kit contains a self-pacing cassette, posters, spirit masters, manipulatives and teacher's manuals. Rated good by the school.

One of the most complete kits was that marketed by Math-Master and called Metrikit. This kit was designed to provide all the tools necessary for children to develop the ability to "think"

metric and to use metric measurement correctly. This kit contains every manipulative for teaching area, length, volume, and weight, including work cards and a teacher's manual. It can be used with all grades for the entire group, small groups, or individualized activities.

The kit sells for $175.00. As an experiment one of the teachers checked on the prices of the individual items included in the kit and concluded that it was less expensive to buy the kit.

Rated excellent.

The Math-Master Company also published a second kit called the Metric Lab. Emphasis is placed on grades 3 - 6. The Lab does not contain as many manipulative objects as the Metrikit has. It does have rulers, tapes, masses, beakers, scales, grids, duplicating masters, teacher's manual, a Telor and eight cartridges. The cartridges show, mass, area, volume, temperature, decimals, meters and centimeters. The Telor is an individualized instructional device for use with the cartridges.

The school price for the kit is $124.95.

Rated very good.

In 1974 Charles E. Merrill Publishing Company prepared a kit, named Metrickit, compiled by Francis T. Spanga. This kit has 10 centimeter rulers, 1 meter tape measure, a beaker, 8 activity cards, 10 study guides, and a teacher's manual. It also includes 2 cassettes coordinated with the study guides, and a filmstrip with a coordinated cassette. The narrator on the cassette asks questions to which the students respond in the guide.

$49.95 is the price of the Metrikit.

Teachers ranked the kit fair.

Metmak Kit, an individualized program to teach metric concepts, was marketed in 1975 by Science Research Associates, Incorporated. The program is similar in format to the S.R.A. Reading Program. It is an individualized, self-pacing method of teaching and learning which is excellent for use in a heterogeneous classroom or in a homogeneous one. The material is well presented, challenging, and motivating for students. It is suitable for upper elementary grades.

The cost of the kit is $84.50.

Faculty and children rated this kit very good.

One of the best metric kits was designed by Singer

Society for Visual Education. Beginning Metric Measurement Learning Module, a kit containing all types of manipulative objects plus 6 full color sound filmstrips, presents the basic concepts of the metric system in a clear, informative, and most interesting manner. The lessons accentuate the act of measuring and develop ability to use the unfamiliar language of S. I. Althouth the kit was designed for the primary, it can be used with elementary children who have never been exposed to metric.

Cost is $134.50.

Children rated the kit excellent, and the teachers concurred.

Kits were evaluated by teachers and students according to their usefulness in the class setting. The critical descriptive analysis was based on the number of manipulative objects in the kit, the metric life-experiences outlined, the clarity of the lessons or cassettes provided with the kit, and the kit's value as a supplementary arm of the regular teaching text. It was the unanimous opinion of all who were involved in the laboratory experiment that kits should be included in any purchases made.

Filmstrips and Cassettes

The use of filmstrips and cassettes in the introduction of children to the mysteries of the metric system provided stimulation, amusement, and delight as well as the concepts and vocabulary of S. I. Filmstrips prepared for kindergarten and primary children were almost as fascinating for the elementary classes. The filmstrips in the inventory were used constantly in all classrooms. The sound filmstrips in color were particularly valuable. Thanks to the kindness and generosity of the audio-visual suppliers, there were many to use and evaluate.

One of the first sound filmstrips used was one provided by the Cambridge Book Company. Under the title, Let's Go Metric I, there are three cassettes and six filmstrips in color which give a brief history of the metric system and then explain units of length - meter, centimeter, and millimeter; and mass - gram and kilogram. This set was prepared for kindergarten to Grade 6. Let's Go Metric II includes four sound filmstrips and two cassettes which review the measurements

of Metric I and then develop the units of Volume - liter and milliliter.

The filmstrips are exciting, the material is well presented, each concept is carefully developed, and all children from the youngest to the eleven year olds feel that "Metrics" are fun.

Let's Go Metric I sells for $75.00

Let's Go Metric II sells for $57.00

The program was classified as excellent.

Let's Learn About The Metric System, consisting of a filmstrip and a cassette, was developed for presentation to the very young child. This program is very appealing to primary and kindergarten children because of its excellent original songs.

This system sells for $12.95

Meter, Liter, and Gram Fun is another program written and developed by an expert teacher in the field of primary education. The original songs and music enhance the learning of the concepts for the young student. The set contains 4 filmstrips, 4 cassettes, duplicating masters, and a

guide. This is an excellent program for little children for only $75.95.

Ready Go Metric is a third program devised for the young. It comprises 2 filmstrips and 2 cassettes plus a guide. The purpose of the set is to introduce metric measurement in a simple but stimulating manner so that children will "think metric."

This is a good set and costs only $26.95.

The three filmstrips just mentioned and Let's Talk Metric were developed by the Clark Company, Inc. Contrary to the others this set was planned for the upper elementary level and the middle/junior high school level. There are two sound filmstrips, two cassettes, twelve transparencies and spirit masters. This is a complete and more sophisticated presentation of S. I. It was judged very favorably by the fourth and fifth graders.

The price is a moderate $36.50

One of the most popular titles used is The Metric System. Audrey V. Buffington uses the title to present a delightful series, narrated and designed to teach meter, centimeter, liter and kilogram to third and fourth graders. The set consists of

four full-color sound filmstrips and four cassettes. The author uses photographs of real people and familiar things to remove the metric system from a theoretical area into everyday life. The setting for the filmstrips is lovely and absorbing, and such fun. [1.]

The series is published by the Creative Learning Center and is sold for $79.50. The filmstrips and cassettes were thoroughly appreciated and enjoyed the approval of the teachers and children who used them.

Another primary teacher, turned producer, devised an appealing and meaningful program consisting of three sound filmstrips with student sound sheets, presided over by a comical but lovable character named Mr. Windbag. This innovative series develops the concepts of metric length, volume, and weight along with the necessary metric language as the children follow The Adventures of Mr. Windbag in Metric Land. The program is divided into two parts. The first tells an innovative concept story filled with fun, music, and songs. Part II

1. See Appendix - District 5 - Area 3 Newspaper

is concerned with concept development and expansion through questions and response. This material may be used for the class as a whole for small groups or for individuals in the primary grades. Nothing lower than excellent from the committees on this series. Educational Products Inc. published the Mr. Windbag filmstrips for $75.00.
The above company also prepared a series of two sound filmstrips and activities to help students in grades four to eight gain a real understanding of the basis of the metric system. The filmstrips, titled Think Metric, present the basic units of measurements, show their interrelationships, and relate the use of S. I. in our everyday lives. The program was formulated to help children develop mental images of meter, liter, and gram. Like the first series, this one may be used for the entire class, for small groups, for individual work, or for remedial classes. The accuracy of the material is unquestioned since the activity workbook was prepared by F. J. Helgren of the Metric Association.
This set of filmstrips may be purchased for $29.00.

Fourth and fifth grade teachers and students considered Think Metric a very good tool. Eye Gates House developed a set of four filmstrips and two cassettes for primary and intermediate entitled Learning to Measure in a Metric World. The series uses topics such as "Why Do We Measure?" "How Tall, How Far and How Fast?" "How Much Does It Hold?" "How Much Does It Weigh?" Many students preferred this unit to any of the others even though the "fun" angle was not emphasized.

A second series for the elementary level and above is called Thinking Metric. This set presents many comparisons between the English and metric systems but absolutely no conversion. Teachers and children liked both sets and, therefore, they have been ordered. The first set sells for $38.85 and the second for $42.85.

Ernest R. Duncan is well qualified to produce cassettes and worksheets for the elementary grades since he has been a teacher, supervisor, and administrator in elementary schools. Houghton Mifflin is the publisher of the Metric System Teaching Tapes for grades 3 - 8. The complete set includes six cassettes, six packets of student

worksheets, a teacher's guide, and a three ring binder. There are six lessons presented in a simple easygoing style by professionals. A four page student worksheet accompanies each tape. The fourth page is used independently for practice. The tapes teach the basic units of length, area, capacity and weight. This is a very good metric teaching unit costing $36.00.

The Metric System of Measurement, produced by Educational Development Corporation for primary and intermediate, presents four full color filmstrips and cassettes which outline the history of measurement, measuring length, weight, and volume. This set of filmstrips and cassettes emphasizes the actual use of metrics on everyday life.

It is a good system provided the student has had introductory lessons in the metric system. These cassettes and filmstrips cost $58.00.

Using the Metric System for primary and elementary classes consists of stories through which children learn problem solving techniques and the metric system at the same time. This series has had classroom testing. Knowledge Aid, the company responsible for this set of six sound filmstrips, has produced a good series for $75.50.

Math-Master's Metric Delights for levels 1 - 3 is a system built upon imaginative stories and worksheets using cassettes and worksheets. There are step by step experiences using meter, centimeter, kilogram, gram and multiples of the metric system. The set retails for $84.95 and includes twelve cassettes and twelve worksheets. This is an excellent innovative series.

A second series by the same company Stories To Help You Think Metric, developed for grades 4 - 6, is composed of a group of filmstrips and cassettes developing linear and square measure, volume, mass, and temperature. The illustrations are excellent and appealing to children. The stories had imaginative, stimulating titles, such as, "The Ice Factory," "The Ice Sculptor," "Tom's Trips Incorporated." The entire set is very clever. However, the authors, Judith H. Ricker and Auriel A. LaFond are experts in teaching metrication. This complete program sells for $165.60.

Nystrom-Clearvue Inc. has produced a set of four filmstrips and two cassettes for the lower to middle elementary students. These consist of such titles as: "What Is Measurement?", "Let's Look At Length," "Let's Look At Volume," Let's Look At Mass." The filmstrips are very well

presented, the metric material is accurate, clear and precise and each filmstrip handles one phase of metric measurement. Faculty opinion evaluated this set as excellent but suggested that a certain amount of preparation precede the use of the filmstrips. The cost of this unit Understanding the Metric System is $40.50.
A definite pattern seems to have evolved in the manner in which the best filmstrips and cassettes have been developed although each author worked independently. Emphasis has been placed on making the child feel that metrics is fun. One reason for this may be to shelter the child from the apprehension that most adults express at having to learn and understand the metric system and its terminology. Though the aforementioned filmstrip and tapes the child learns S.I. as he would any new subject presented to him in a special and exciting manner.
Graphic presentations are appealing to the student and are much more meaningful to some children than the printed page. It is recommended that each school's inventory include filmstrips and cassettes.

Duplicating Masters

No metric inventory would be complete without duplicating masters. These provide the teacher with a tool which may be used as often or as little as the teacher feels necessary. They are supplementary and excellent for reinforcement of skills developed in textbooks, kits, or filmstrips. The cost of this type of material is very low because each duplicating master can produce 150 - 200 copies.

Addison-Wesley has three fine sets of duplicating masters. Set A, devised for Grades one and two, has thirty-two masters. Sets B and C have forty masters. Set B was developed for Grades three and four, and C for Grades five and six. These sets present in a simple fashion all units the child will need for everyday use.

Metrics, which may be obtained from Charles W. Clark Co., Inc., is composed of eighteen duplicating lessons for individual or group activity prepared for primary and elementary classes. These lessons were designed to sharpen skills for measuring and estimating metric length, area, weight, and volume. The cost is only $3.95.

A series of fifty masters, called Metrication Masters, is purported to be a complete course in metrication and strangely enough the set lives up to its claim. The set at first seems expensive at $19.98 but since each master produces between 150 - 200 copies, the cost is low. The masters need not be used in sequential order because each lesson begins, develops, and extends a separate lesson in metric measurement. These lessons cover all the basic units. The teachers rated this set, published by Holt, Rinehart, and Winston, as one of the best and most useful.

The Metric System, written by Diane Rabenau for Instructor Publications, presents lessons in which the concepts of measurement are introduced followed by exercises designed to reinforce the concepts and provide practical experience in measuring. The material was designed to supplement the teaching of the metric system in the areas of science and mathematics. There are three books in the series, two grades to a book. Each book has eighteen duplicating masters costing $3.75.

A second set from the same publisher is entitled Measuring With Metrics. The twenty masters use a self-directing, activity oriented, discovery approach to metrication. The material is most appealing to children who seem to enjoy working with the masters.

The last series differs from the preceding items because it includes both masters and transparencies. Understanding The Metric System, devised by Pat and Tom Heineman, includes fourteen spirit masters and twelve color transparencies for Grades 4 - 6. The transparencies are visually accurate, simple-to-use, and valued by teachers because they save many hours of preparation. The transparencies provide a colorful, stimulating introduction before using the master. Teachers and children approved this series.

The duplicating masters used at the Taylor were assessed by the faculty as excellent tools to have whether the teacher uses them as teaching lessons or correlates them with a classroom text. They provide in-depth study and work opportunities for individual or group work.

Taylor personnel classified the duplicating masters included in the inventory as a most valuable part of the teaching-learning experience.

Worktexts - Activity Books

Worktexts and activity books may be used as a regular textbook or they may function as supplementary materials to reinforce the skills and concepts developed in the basic text. Since the worktexts do not follow any particular math series, teachers used the lessons at their own discretion and not in sequential order. The faculty declared that this was an advantage in having this type of material. The items listed below were among those approved for use in the school.

The Metric System produced for Grades 4, 5, and 6, is an Addison-Wesley contribution. Although Addison-Wesley does have a mathematics system, this activity book may be used independently because it was not developed for the sole purpose of implementing the company's basic text. This worktext introduces the student to the metric system through a series of simple steps

which develop his ability to use S. I. and familiarize the student with metric nomenclature. A pupil's text is only $1.50, and the teacher's edition is $2.10.

One of the simplest, best, and least expensive worktexts is Beginning Metrics by Joanne Wylie. This workbook tried out in the primary grades at the Taylor is published by Golden Press and costs only 79¢. Our parent councils purchased this text so that they could learn the basic facts along with their children. This was regarded as an excellent beginning.

Laidlaw Brothers' Exploring The Metric System - Meter, Gram, Liter is a consumable text for Grades 4 - 6 which can be used for individualized work, supplementary lessons, or for enrichment. These workbooks cost 66 cents per copy. The faculty assessed this text as very useful.

A series of six booklets, written by Audrey V. Buffington, called Meters, Liters and Grams presents metric information in a manner designed to appeal to children. Teachers were very pleased with the way in which each booklet was structured. Since the booklets are graded in

difficulty, provision is made for different levels of ability. These booklets were prepared to provide metric information for grades 3 through 8. Random House sells the pupil's text for $1.44 and the teacher's manual for $1.50. This is a good series.

McGraw-Hill Book Company developed two worktexts: Exploring Metric Measure for K - 3, and Discovering Metric Measure 4 - 6. These worktexts were developed in Canada and teach the processes of measurement and the standard units of metric. The K - 3 book has a set of masters which accompany the guide. Teachers did not rate this series too highly. The page presentation was not as stimulating as that found in other texts. The pupil's edition was $1.62 and the teacher's manual was $1.80.

No inventory would be complete without worktexts or activity books. From a cost standpoint they are relatively inexpensive. They may be consumable materials in the primary grades but not in the elementary grades. There is still a paucity of good activity books.

Textbooks

An essential part, but a most expensive one, of the inventory and the laboratory experiment was the evaluation of textbooks. With the increased cost of paper and labor, books have skyrocketed in price. Planning for a class of thirty was vital due to population changes, and the average cost of thirty books plus a teachers edition was roughly in the vicinity of $240.00. This did not include the cost of workbooks, worksheets, tests or any auxiliary materials. Since the experiment depended upon classroom testing and learned-verification, priority in the evaluation was given to those mathematics or science systems which were supplied in sufficient number to be tried in each grade level or in one grade level. The two companies which volunteered immediately to contribute books, workbooks, and supplementary materials for the inventory were the Cambridge Book Company and Holt, Rinehart, and Winston, Inc.

It must be understood that textbooks were evaluated to determine their metric system content and the metric skill maintenance in the program.

Basic skills developed in the first grade level must be extended, reviewed and expanded on each succeeding grade level.

The Cambridge Book Company produced The Cambridge Mathematics Program to develop basic and new computational skills for grades 1 to 8. Metric information is provided in Grade 1 and each succeeding grade reinforces the previous skills and adds concepts and knowledge. This, according to the faculty, is an excellent series both for metrics and for basic mathematical skills. Costs vary according to the instructional level but there are no workbooks involved in the Program.

Holt, Rinehart and Winston, Inc. published a complete program including texts, workbooks, transparencies, visuals, filmstrips, and manuals. The faculty believed that the metric portion of the program plus the provision for instructional components and teaching strategies that motivate all types of children are excellent. The supplementary materials which provide enrichment, reinforcement, and incentives for individualized instruction are

outstanding. These used in an inventoried laboratory or resource room are not too expensive. The third company to agree to a pilot program was Science Research Associates. The SRA series, The SRA Mathematics System, is an individualized system. On the primary level there are pupil texts, spirit masters and and teacher's guides, Levels 4 - 6 add five books to the series. The metric system is taught as a separate strand beginning in grade one. As an individualized system the faculty classified this series as good.

Houghton-Mifflin's series, School Mathematics-Concepts and Skills and Mathematics for Individual Achievement were regarded as very good because the metric system did not receive just token consideration and was very well presented.

A favorable evaluation was also given to the D. C. Heath Elementary Mathematics Program. Children are exposed to a comprehensive treatment of metric measurement beginning in Level 1 and consistently preceding discussion of the English system. Teachers are provided with all

the materials necessary for complete individualization.

Motivational activities and sufficient reinforcement activities were found in Scott Foresman's new 1975 series, Mathematics Around Us: Skills and Applications. Teachers and students who used the textbook liked it.

Other textbooks which were laboratory tested were not recommended for many different reasons. First of all many publishers have given only token recognition to the importance of metrication in the child's world. One or two pages in a textbook did not indicate to the faculty that a good metric unit existed. Thirdly, many programs introduced S. I. on one page, the English system on a second, and mixed the two on a third page. This procedure caused the child to convert almost automatically. Estimation, as a learning process, was accepted but was not to be emphasized.

The two series rated as superior by the entire faculty were the Cambridge Mathematics Program and the Holt School Mathematics Program.

Cost Analysis

It was decided by the faculty and the administrator to use thirty pupils as the base to determine per pupil cost because of transiency problems. Manipulative kits, filmstrips and cassettes, duplicating masters, and activity books seemed relatively inexpensive when figured on this basis. Textbooks with all the accompanying materials proved to be expensive.

Kits

Company	Name	Cost (30)	Per Pupil Cost
Addison-Wesley	Metric Kit A	$69.95	$2.33
	Metric Kit B	$69.95	$2.33
Cuisenaire Co.	I Metric Length	$ 6.50	
	II Metric Area	$ 6.50	
	III Metric Volume	$ 5.50	
	All Three	$13.75	$0.46
Educational Teaching Aids	Metric Multimedia Kits A, B, C	$42.50	$1.42
Math-Master	Metrikit	$175.00	$5.33
Math-Master	Metric Lab	$124.95	$4.17
Chas. E. Merrill	Metrikit	$49.95	$1.67
Science Research	Metmak Kit	$84.50	$2.82
Singer/SVE	Beginning Metric Measurement	$134.50	$4.48
Instructor Publications	The Metric System	$ 3.00	$0.03

In one of the many committee meetings teachers volunteered to test kits to determine which ones they would find most useful if the budget were severely limited for this type of educational material. Primary teachers voted to order Singer/SVE Beginning Metric Measurement - . Since there were three first grades who could use the material on a programmed basis, the per pupil cost was reduced to $1.50 per pupil. They reasoned that with a resource room, it would also be possible to order Addison-Wesley's Metric Kit A, reducing the cost for three classes to $0.78 per pupil. Teachers decided that the sharing policy would allow the purchase of more diversified materials. The elementary teachers came to the same conclusion.
The determination had previously been made that manipulative kits were necessary to develop activity related experiences in metrics.

Cassettes and filmstrips

These visuals provided a stimulating approach to the teaching of metrication. They were a springboard to further discussion of the various areas and language of metrics. Can schools afford them?

Company	Name	Cost (30)	Per Pupil Cost
Cambridge Book Co.	Let's Go Metric 1	$75.00	$2.50
	Let's Go Metric 2	$57.00	$1.90
C. W. Clark Co., Inc.	Let's Learn About The Metric System	$12.95	$0.43
	Let's Talk Metric	$36.50	$1.22
	Meter, Liter, and Gram Fun	$75.95	$2.53
	Ready Go Metric	$26.95	$0.90
Creative Learning Center	The Metric System	$79.50	$2.65
Educational Products, Inc.	The Adventures of Mr. Windbag in Metric Land	$75.00	$2.50
	Think Metric	$29.00	$0.97
Eye Gate House	Learning To Measure In A Metric World	$38.85	$1.30
	Thinking Metric	$42.85	$1.43
Houghton Mifflin	Metric System Teaching Tapes	$36.00	$1.20
Imperial Film Co.	The Metric System of Measurement	$58.00	$1.73
Knowledge Aid	Using The Metric System	$75.50	$2.52
Math-Master	Metric Delights	$84.95	$2.83
	Stories To Help You Think Metric	$165.60	$5.52
Nystrom-Clearvue, Inc.	Understanding The Metric System	$40.50	$1.35

Certainly to purchase the above materials for each classroom would be impossible. However the

laboratory and the inventory proved that per pupil costs could be further reduced if teachers were willing to share. If The Adventures of Mr. Windbag in Metric Land were used in three classes, the per pupil cost would be reduced to $0.83 per pupil.

Stories To Help You Think Metric, a complete measurement kit listed at $165.60, would cost only $5.52 per pupil if used in three classes. The big saving will result from the fact that the materials chosen have been classroom tested and learner-verified by the teachers who will order them. The recommended list of audio visuals was culled from many filmstrips and cassettes which did not prove satisfactory to the teachers using them.

Duplicating Masters

The most expensive of the duplicating masters is $19.98 for 50 masters and the least expensive $3.75 for 28 masters.

Holt Rinehart, and Winston Inc.	Metrication Masters 50 masters	$19.98	$0.67
Milliken	The Metric System 28 masters	$ 3.75	$0.13

Considering the number of masters averaging 150 copies per master, this was the least costly teaching aid in the entire inventory. The masters chosen were recommended for accuracy, techniques and cost.

Worktexts - Activity Books

Worktexts and activity books may be used as regular texts or as supplementary material. The only problem involved was the fact that some worktexts were prepared for use in three grades, i. e. grades 4, 5, 6. When children have already been exposed to metrication for three years these materials would be consumed in grade 4, necessitating the purchase of other workbooks for five and six.

Company	Name	Cost		Per Pupil Cost
Addison-Wesley	The Metric System (4-5-6)	Pupil text Teacher	$1.50 2.10	$1.57
Golden Press	Beginning Metrics (Gr. 1-2)	Pupil text	$0.79	$0.79
Laidlaw Bros.	Exploring the Metric System Meter, Liter & Gram (4-5-6)	Pupil text Teacher	$0.66 0.90	$0.69
Random House	Meters, Liters and Grams Buffington, A.V. 3,4,5,6,7,8- 1 book per level	Pupil text Teacher's	$1.44 1.50	$1.49

Webster - McGraw Hill	Discovering Metric Measure	Pupil text Teacher's	$1.62 1.80	$1.68

The Random House publications by levels would be less costly in the long run because each workbook develops concepts and vocabulary in sequential order and difficulty. The others proved valuable when an entire school was being introduced to metrication for the first time. The workbooks and activity texts were very effective in the learning situation and should be considered for purchase by all administrators.

Textbooks

The most expensive item to be purchased out of the per capita budget is the textbook with its accompanying workbook, teacher's manual, and other materials published to make the teaching learning experience more meaningful. However, when the administrator considers that textbooks are used for at least five years, the per pupil cost is reduced over that period of time but the initial cost is high.

Seven of the textbooks studied meet the criteria established by the faculty. The excellence of the macerials encouraged teachers to think of

ways to obtain all items in a series and to stay within budgetary limits. Figures are based on 30 copies per class.

Company	Name	Cost	Per Pupil Cost
Cambridge Book Co.	Cambridge Math Program		
	Gr. 1	$62.37	$2.08
	Gr. 2	$62.37	$2.08
	Gr. 3	$80.04	$2.67
	Gr. 4	$80.04	$2.67
	Gr. 5	$80.04	$2.67
	Gr. 6	$80.04	$2.67
D. C. Heath	Heath Elem. Math Program		
	Level 1	$86.07	$2.87
	Level 2	$86.07	$2.87
	Level 3	$147.06	$4.90
	Level 4	$147.06	$4.90
	Level 5	$147.06	$4.90
	Level 6	$147.06	$4.90
	Supplementary Materials		
	Level 1 (90)	$50.40	$0.56
	Level 2 (90)	$68.70	$0.76
	Level 3 (90)	$77.70	$0.86
	Level 4 (90)	$77.70	$0.86
	Level 5 (90)	$77.70	$0.86
	Level 6 (90)	$77.70	$0.86
Holt, Rinehart & Winston Inc.	Holt School Mathematics Program		
	Book 1	$79.17	$2.64
	Book 2	$79.17	$2.64
	Book 3	$141.39	$4.71
	Book 4	$141.39	$4.71
	Book 5	$141.39	$4.71
	Book 6	$141.39	$4.71
	Supplementary Materials		

	(90) Grade 1	$273.66	$3.04
	(90) Grade 2	$273.66	$3.04
	(90) Grade 3	$273.66	$3.04
	(90) Grade 4	$306.66	$3.41
	(90) Grade 5	$306.66	$3.41
	(90) Grade 6	$306.66	$3.41
Houghton - Mifflin Co.	Mathematics for Individual Achievement		
	Level 1	$91.80	$3.06
	Level 2	$91.80	$3.06
	Level 3	$152.31	$5.08
	Level 4	$152.31	$5.08
	Level 5	$153.21	$5.11
	Level 6	$153.21	$5.11
	Supplementary Materials		
	Level 1 (90)	$11.22	$0.12
	Level 2 (90)	$11.22	$0.12
	Level 3 (90)	$12.96	$0.14
	Level 4	$15.87	$0.18
	Level 5	$15.87	$0.18
	Level 6	$15.87	$0.18
Houghton - Mifflin Co.	School Mathematics: Concepts and Skills		
	Book 1	$88.50	$2.95
	Book 2	$88.50	$2.95
	Book 3	$145.65	$4.86
	Book 4	$147.45	$4.92
	Book 5	$147.45	$4.92
	Book 6	$147.45	$4.92
	Supplementary Materials		
	Book 1 (90)	$16.02	$0.18
	Book 2	$16.02	$0.18
	Book 3	$20.04	$0.22
	Book 4	$20.04	$0.22
	Book 5	$20.13	$0.22
	Book 6	$20.13	$0.22
Science Research Associates	S.R.A. Mathematics Learning System		
	Level 1	$76.20	$2.54

	Level 2	$76.20	$2.54
	Level 3	$102.90	$3.43
	Level 4	$148.70	$4.95
	Level 5	$148.70	$4.95
	Level 6	$148.70	$4.95
	Supplementary Materials		
	Level 1 (90)	$12.48	$0.14
	Level 2	$12.48	$0.14
	Level 3	$18.72	$0.21
	Level 4	$18.72	$0.21
	Level 5	$18.72	$0.21
	Level 6	$18.72	$0.21
Scott Foresman Co.	Mathematics Around Us: Skills and Applications		
	Book 1	$97.68	$3.26
	Book 2	$97.68	$3.26
	Book 3	$150.45	$5.02
	Book 4	$150.45	$5.02
	Book 5	$150.45	$5.02
	Book 6	$150.45	$5.02
	Supplementary Materials		
	Level 1 (90)	$44.42	$0.49
	Level 2 (90)	$45.02	$0.50
	Level 3 (90)	$55.44	$0.62
	Level 4 (90)	$55.44	$0.62
	Level 5 (90)	$55.44	$0.62
	Level 6 (90)	$55.44	$0.62

The textbooks listed above are representative of the usual cost for most mathematics series. The amount specified for each level represents the cost of textbooks and a teacher's manual for one classroom. If these texts were to be adopted in the Taylor, it would be necessary to purchase twenty-five sets at a cost of over $30,000. With

a per capita allotment of $45.00 per child, it would be impossible to buy other items which are paid out of per capita.

The faculty decided that supplementary materials, such as visuals, tests, duplicating masters, worksheets should not be ordered by each individual teacher. They recommended a set of supplementary materials be ordered for each grade level and kept in a resource room. This procedure would cut the per pupil cost for these items to one-third of the amount. For example, to purchase Level 4 of Holt, Rinehart and Winston's filmstrips, transparencies, duplicating masters, tests and worksheets at $306.66 per class would average $10.22 per pupil. In a resource room with three classes or 90 pupils using the material the per pupil cost is $3.41 per pupil.

If an administrator has to purchase replacements for an old math series, the recommended texts were chosen for the copyright date 1974 or 1975. This will reduce costs because the books can be used for five to seven years without mandatory orders to discard them. The analysis attempts to

point out the cost of the text plus the teacher's manual as a separate item to be considered by the purchaser.

These textbooks were chosen because they contained a greater amount of metric measurement and information than others. Since the problem was to find mathematics series which met the criteria established by the faculty, which contained teaching suggestions and materials to implement the model developed in the Maxi I, and which could be justified as a worthwhile expenditure, the search narrowed down to the texts just analyzed. The consensus of opinion supported the recommendation of the seven textbooks.

EVALUATION

Teacher evaluation of metric products was naturally one of the most important phases of the study. Their critiques of the items were based on actual use and careful consideration of the impact of the material used in the teaching/learning experience. Conscious of the budgetary loss due to inflation and rising costs, teachers assessed and compared many items to decide which one provided the best learning experiences for children. The evaluation sheets which were finally handed to the chairman showed thoughtful analysis of content versus cost.

Evaluation by pupils proved helpful in determining whether expensive items were more appealing than less costly ones.

A useful and versatile instrument for assessing this educational activity is the Scriven Product Evaluation Profile. Therefore this has been included as an ancillary check on the experimental laboratory inventory method of testing metric materials and determining their value in the classroom. This instrument was also used in evaluating the model developed to introduce the metric system in the elementary school.

1. NEED (Justification)

   Since there is a genuine need to teach the metric system in the elementary school, the need also exists to collect, try out, and evaluate educational products devised to teach metrication to children. There is an economic consideration involved which cannot be ignored.

2. MARKET (Dissemination)

   There is definite value in establishing a list of tested, learner-verified metric commodities which have proven their worth as tools in teaching metrication to children. This market will increase by leaps and bounds as educators realize the inevitability of S. I.

3. PERFORMANCE - True Field Trials

   True field trials were made with 627 children and twenty-seven teachers.

4. PERFORMANCE - True Consumer

   It is quite common to have several groups of consumers of a given project. There were four groups, each interested in different aspects of the plan: children, teachers, parents, and the administrator.

5. PERFORMANCE - Crucial Comparisons

   Competitive products were compared and evaluated by students and teachers.

6. PERFORMANCE - Long Term

It is apparent that there will be long term results from the study, S. R. A. has asked the school to evaluate their new manipulative metric kit in September. The recommended list will be used in the city.

7. PERFORMANCE - Side Effects

An important side effect has been the impact on teacher consumers to see the necessity for content analysis of metric materials, and other aids to determine whether they live up to the publisher's statements or whether the statements are misleading.

8. PERFORMANCE - Process

The laboratory approach to the evaluation of metric educational products proved to be an excellent way to critique the content and the suggested manner of implementation in the classroom.

9. PERFORMANCE - Causation

No other method would have developed the desired product or satisfied the needs.

10. PERFORMANCE - Statistical Significance

Sophisticated statistical significance was not part of the design.

11. PERFORMANCE - Educational Significance

Educational significance was validated through the Teacher and Pupil Evaluation Sheets which were used with each product in the inventory. A need definitely was met.

12. COSTS AND COST-EFFECTIVENESS

The model for teaching S. I. developed in the Maxi I emphasized accuracy, simplicity, and relevance. The experiment allowed the participants to check materials generated by publishers free. Each item submitted for study was analyzed for content and for cost. The consumers' recommendations were based on the justifiability of the expenditure for the item.

13. EXTENDED SUPPORT

Improvement could be described as continued analysis of all new metric commodities.
The product, i. e. the inventory-laboratory process, could be applied to educational materials prepared for other learning areas.

RECOMMENDATIONS

As a result of the experimental project the following recommendations are made:

1. Faculty members should be given the opportunity to review and use metric materials before ordering them.

2. Administrators and teachers should check educational materials to ascertain whether they have been learner/verified and where they were tested.

3. Resource Rooms should be established in a school so that an inventory or library of audio-visuals ordered by teachers would be set up for use by all faculty members of the same level.

4. Provision should be made in order that supplementary educational tools would be shared by two or more teachers to reduce costs.

5. Skills and techniques developed by Taylor faculty members in this experiment should be applied to future metric educational products, and to other subject area materials.

6. The descriptive and the cost analysis lists should be distributed to all areas in the city to assist in the purchase of appropriate, cost-effective metric items.

7. The learner/verified recommended that lists should be sent to Mr. Richard A. Carbone, State Department of Education, Chairman, Metric Advisory Committee.

8. Publishers should be informed that educational materials should be given to schools for an evaluation period of at least two months. This would be accomplished through the cooperation of Area Superintendents and area administrators.

CONCLUSIONS

As the study is terminated, it must be stated that the experiment was successful in the opinion of those involved.

The objectives of the program were realized. Objectives 1 - 4 were an actuality. Publishers and educational suppliers did provide materials for the inventory at the Taylor. An inventory of numerous texts, workbooks, and audio-visuals was established in the Taylor School. This was the first opportunity that the faculty had ever had to actually use, review, and evaluate educational items before ordering them. Informative meetings with parents have resulted in their request for the names of the materials which their children were using so that they could become acquainted with the metric system. [1]

Objective 5 was concerned with the skills and techniques developed as a consequence of the evaluation and cost analysis of the Taylor inventory. The incentive and stimulus for faculty

1 See Appendix A

members because of the experiment was tremendous. All expressed a desire to participate in further experiments and agreed as a group that they will follow the criteria before ordering additional metric items. [2]

Through the concern of the Area and Associate Superintendents the lists of recommended metric materials will be (and are being) distributed. Already Nova participants have requested metric materials evaluated by Taylor personnel. Interest in good, worthwhile metric products has been generated during the past year and, therefore, personnel in the city and Nova participants have begun to realize the inevitability of teaching the metric system. Thus, objectives 6 - 8 have been implemented. [3]

Producers of educational items have expressed a willingness, as stated in objective 9, to continue to supply the Taylor School with materials to be tried before purchase. At this writing, Mr. Dean Coe of Science Research Associates, has delivered

2 See Appendix B
3 See Appendix C

a complete kit consisting of three parts, worth five hundred dollars, to be evaluated by the faculty. [4]

The criteria used in the assessment were determined by the model developed in Maxi I. The model accentuated the act of measuring and so the materials were judged on the basis of the number of exercises or lessons which required the student to measure. The child learned to measure in a relatively unfamiliar language but the materials related each new term and idea to familiar everyday experiences in the child's life. The model recommended this criterion.

The experiment was most rewarding because of the cohesive factor in bringing understanding and cooperation to two very distinct and separate groups - school personnel and publishers representatives. The salesmen accepted the idea of learner/verification and willingly brought metric materials. Periodically they asked to see the

4 See Appendix D

evaluation sheets - one asked to bring samples to an administrator in another city. The faculty enjoyed the novelty of having salesmen respect their expertise in judging which materials were most beneficial to their children.

The administrator, as a member of A. A. S. A. points with pride to the fact that, as requested by the organization in April, 1975, she has given affirmative leadership to this important subject - metrication. [1]

1 The School Administrator - A. A. S. A. - April, 1975, P. 15

A P P E N D I X A

LETTERS FROM PARENTS AND PUBLISHERS

June 20, 1975

Dear Miss Nancy,

Danny was most interested in the Metric program and, as a result, so was our family. We have all learned something about metrication and are happy to be ahead of everyone else.

The number of books and filmstrips on hand at the school was surprising. I hope that companies will still allow the Taylor School to use materials without charge.

This has been a very profitable year for us.

Sincerely yours,
Mrs Daniel Antonino

June 25, 1975

Dear Miss Maney,

Thank you for bringing the Metric System to my son John's education. His interest and curiosity were sparked by this system of measurement.

The Metric System came home with him and his family became involved and educated. We purchased metric rods and measuring cups and proceeded to look at the world in terms of millimeters, centimeters, kilograms and kilometers. Walls were measured, waists, heights, cereals, rugs and even our dog.

In June my son took part in your Metrathon at the school. Although he was not a winner, the experinces he had I am sure will remain a highlight of his third grade.

Thank you so much for being ahead of the times, for helping the children and, in this case, the parents also in learning what's new and necessary.

Have a nice summer - hope to see you in September.

Very truly yours,

Barbara Hughes

HOLT, RINEHART AND WINSTON, INC.

June 8, 1975

Miss Catherine Maney
Principal, Charles Taylor District
1060 Morton Street
Mattapan, Massachusetts 02136

Dear Miss Maney:

Please accept Holt, Rinehart and Winston's thanks and appreciation for your part in piloting the Holt School Mathematics program in the Taylor District Schools.

We are particularly pleased with your positive reaction, and that of your staff, to the spiral development of the metric system within the entire program.

At a time when accountability is affecting educational publishers as well as teachers, it almost goes without saying that it is only with the able assistance of professional educators such as yourself that we are able to make such progress on our efforts to collect and analyze learner-based research information. This will be one more valuable aid to us in the research reports we are now preparing.

Sincerely yours,

Robert D. FitzGerald
Vice President
National Sales

RDF/lr

383 MADISON AVENUE / NEW YORK, N. Y. 10017 / TEL. 212 MU-8-9100

A P P E N D I X B

LETTERS FROM TEACHERS

September 5, 1975

Dear Miss Maney,

Last year the teachers at the Taylor had the unique privilege of previewing and using metric material in order to determine their relevancy and suitability to the needs of our students. As the teacher in charge of distributing said material, I know all the teachers found this most helpful in the selection of material.

We hope this same opportunity will be extended us this year and also extend it to other subject areas.

Gratefully yours,

William J. Murphy

September 5, 1975

Dear Miss Maney,

I am most grateful for having had the opportunity last year to preview, select, and use the appropriate metric materials in my teaching the subject to the students in Grade One.

I sincerely hope I shall have the same opportunity again this coming school year.

Sincerely yours,

Grace Lindsay

Grace Lindsay
Grade 1, Charles H. Taylor School

September 4, 1975

Dear Miss Maney:

Thank you very much for the privilege of previewing, selecting, and using metric materials during this past school year. I found this extremely helpful in assessing the value and suitability of teaching metrication to the students. May I have the same opportunity to do so during the next school year?

Sincerely,

Marie Dever

Marie Dever
Grade 2
Charles H. Taylor School

A P P E N D I X C

REQUESTS FROM ADMINISTRATORS
BOSTON, STATE, NOVA

THE SCHOOL COMMITTEE OF THE CITY OF BOSTON

ROGER WOLCOTT SCHOOL

JOHN J. BRADLEY
PRINCIPAL

June 23, 1975

Miss Catherine M. Maney
Principal, Charles Taylor District
1060 Morton Street
Dorchester, Massachusetts 02126

Dear Miss Maney:

Just a brief note to thank you for the tremendous help you rendered my district this year.

As you remember, I was faced with the problem of introducing the metric system to my pupils. The list of thoroughly researched and catalogued materials you sent us was of invaluable assistance both in programming and purchasing procedures. In addition, the knowledge that they had been tried in your classrooms was most reassuring.

In conclusion, the staff, pupils and myself will always remember your generosity and professionalism.

Sincerely,

John J. Bradley
Principal

JJB:eb

441 NORFOLK STREET • MATTAPAN, MASSACHUSETTS 02126 • 298-1840 AREA 617

THE SCHOOL COMMITTEE OF THE CITY OF BOSTON

BOSTON PUBLIC SCHOOLS
THOMAS GARDNER DISTRICT
OFFICE. THOMAS GARDNER SCHOOL

ROBERT N. MEAD
PRINCIPAL

June 20, 1975

Miss Catherine M. Maney, Principal
Charles H. Taylor School
1060 Morton Street
Mattapan, Massachusetts 02126

Dear Miss Maney:

It has been brought to my attention that the pupils and teachers at the Charles H. Taylor School have been evaluatingmetric materials.

I would appreciate your sending me a list of the materials that would assist me in ordering metric materials in the near future.

Sincerely yours,

Robert N. Mead

Robert N. Mead
Principal

RNM:MP

BRENTWOOD AND ATHOL STREETS • ALLSTON • MASSACHUSETTS 02134 • 782-2288 AREA 617

MAY 5 1975

The PUBLIC SCHOOLS of SPRINGFIELD, MASSACHUSETTS

Robert O. Morris School
45 Dewey Street
Springfield, Mass. 01109
April 29, 1975

Miss Catherine Maney, Principal
Charles H. Taylor School
1060 Morton Street
Mattapan, Mass. 02126

Dear Miss Maney:

It has come to my attention that you have been doing research concerning the type, availability and price of the various media for teaching the Metric System now on the market.

Since I am looking for the best possible materials for my teachers to utilize next year and have limited funds to spend I would greatly appreciate a listing of your suggested recommendations for teaching the Metric System.

Thank you for your consideration of this matter.

Very Truly Yours,

Georgianna Marshall

Georgianna Marshall
Principal

THE FLETCHER SCHOOL
[illegible] STREET
CAMBRIDGE, [illegible]SETTS 02139
MARY A. [illegible], MASTER

June 1, 1975

Miss Catherine M. Maney
Principal, Charles H. Taylor School
1060 Morton Street
Mattapan, Massachusetts 02126

Dear Miss Maney:

Many thanks for your assistance with metric materials. Your annotated list of the latest publishers' material was a great help to the faculty team as they made plans whether to "go metric" next year. Even more helpful was the visit our team had with you on our visiting afternoon where they had a chance to look and discuss the publishers' metrication efforts.

I have asked Sheila Morshead, our Teachers' Resource Librarian for the whole system, to get in touch with you about the possibility of using your updated listings. If this is not feasible, please feel free to say so.

Thank you again for the help you have already given.

Sincerely yours,

Mary A Blessington

Mary A. Blessington
Master

MAB:m

THE OXFORD PUBLIC SCHOOLS

OXFORD, MASSACHUSETTS 01540

IRWIN POTTLE, Principal
Oxford High School, 987-8127

NANCY JODREY
pervisor of Elementary Education, 987-0246

ANN RICHARDSON
Supervisor of Special Services, 987-0246

DANIEL IVASCYN
Business Manager, 987-0246

STANLEY SEDOR, Principal
Middle School, 987-8740

DORIS BOYLE, Principal
Chaffee School, 987-2928

EDWARD CONNOLLY, Principal
Barton School, 987-2835

VINCENT PALERMO, Principal
Joslin School, 987-8982

JOHN F. MALONEY, Superintendent of Schools
(617) 987-0246

June 6, 1975

Miss Catherine M. Maney, Principal
Charles H. Taylor School
1060 Morton St.
Mattapan MA 02126

Dear Miss Maney:

Thank you for suggesting the name of Dr. Richard Rezba, from Boston University, to conduct preliminary in-service training programs on the metric system for our elementary school teachers. I am pleased to report that Dr. Rezba conducted four successful in-service programs for us. We feel he has helped us to learn some of the basic fundamentals of the metric system. Since your studies are more advanced than ours, I am writing to ask if you have had the opportunity to develop an inventory of metric materials. I am primarily interested in obtaining resource materials on the metric system which have been evaluated and determined, through a cost analysis, to be within the budget expectations of most school systems.

Any information that you can send me which will prevent a duplication of research on the metric system will certainly help us to expedite the implementation of this program into our school system.

Once again, thank you for your efforts in our behalf.

Very truly yours,

John F. Maloney

John F. Maloney
Superintendent of Schools

jfm/aem

WORCESTER PUBLIC SCHOOLS

DORYCE M. MOOSEY
DIRECTOR OF READING

READING CENTER
21 LAMARTINE STREET
WORCESTER, MA. 01610
AREA CODE 617-798-2921
EXTENSIONS 11 AND 12

May 20, 1975

Ms. Catherine Maney
Principal
Charles H. Taylor School
1060 Morton Street
Mattapan, Mass, 02126

Dear Ms. Maney:

It is my understanding that the administration and faculty of the Charles H. Taylor School have formulated a list of materials regarding the metric system.

We in the Worcester Public School system, as all systems, are preparing for the implementation of the use of metric in our curriculum and for that reason would be very interested in your assistance. I would greatly appreciate receiving from you a list of materials on the metric which you would recommend because from your evaluation of them, they are effective and within the limited budget of our school system.

Thank you for your prompt attention to this request.

Sincerely,

Doryce M. Moosey

Doryce M. Moosey
Director of Reading

DMM:pt

CITY OF CRANSTON SCHOOL DEPARTMENT
845 PARK AVENUE CRANSTON, RHODE ISLAND 02910

JOSEPH A. MURRAY
ASSISTANT SUPERINTENDENT - INSTRUCTION

June 24, 1975

Miss Catherine Maney
Boston Public Schools
Charles H. Taylor School
1060 Morton Street
Mattapan, Mass. 02126

Dear Miss Maney:

It has been brought to my attention recently that you are directing a project concerned with evaluating materials for use in the study of metrics.

Our system has been conducting in-service for our teachers in the area of metrication. Our one lack has been a comprehensive analysis of reasonably priced materials for use in our classrooms.

Can you furnish me with whatever information you have available for distribution at this time?

I would be most grateful and would offer you to reciprocate with our developed curriculum and materials.

Success in your endeavors.

Sincerely,

Joseph A. Murray

A P P E N D I X D

LETTER FROM DEAN COE

B6

SRA
SCIENCE RESEARCH ASSOCIATES, INC.
A Subsidiary of IBM

259 East Erie Street
Chicago, Illinois 60611
(312) 266-5000
Cable SCIRESUS, Chicago

August 15, 1975

Miss Katherine Maney, Principal
Charles Taylor School
1060 Morton St.
Mattapan, Mass. 02126

Dear Miss Maney:

It was good to chat with you this week. As per our conversation I am forwarding to you SRA's new Metric Measurement Program for your review. I will be in touch with you after you have had a chance to study the materials.

It is always a pleasure to work with you and the teachers at the Charles Taylor School. The creativity, interest and enthusiasm of all of your staff is refreshing.

Please be assured that we would welcome any opportunity to be of service in the future.

Cordially,

Dean M Coe

Dean M. Coe
SRA Staff Associate

DMC:bb

DEAN M. COE
RFD 4, Box 407
Buzzards Bay, Mass. 02532
224-8491 (617)

Materials of instruction Tests and evaluation services Guidance publications and services

A P P E N D I X E

PUBLICITY - AREA NEWSPAPER

The seven-centimeter smile...

Taylor School Leaps into Metric Er
U.S. drags 'feet', 'inches' toward '79

by Bob Ellis
Staff Writer-Intern

To most of us, Los Angeles is 2797 miles from New York, and New York is 214 miles from Boston.

Similarly, to the parents of students at the Charles Taylor School in Mattapan, the fence that runs the perimeter of the school measures 360 feet, and the distance from the sidewalk in front of the school to the school's front steps is 48 feet. But from inside the Charles Taylor School, the students see these distances differently.

To them, Los Angeles is 4477 kilometers from New York, and New York 346 kilometers from Boston. The fence around their school measures 294 meters; the walkway 14 meters.

This is because for the last year the students at this Mattapan elementary school have been learning distances according to the metrics system.

Recognizing that in 1979 the government plans to convert to the metrics system, Taylor principal Catherine M. Maney decided last fall to scrap the old system of inches and feet and begin teaching straight metrics. "Today's children will be graduating into a metric world and therefore we cannot drag our feet in providing a metric education," she said.

Teachers report that the transition went smoothly. They say that the children adapted to metrics without complaint.

Fifth grader June Ryan attested to this saying that the metrics was "easier than the English system if you know how to do it," and "it's lots more fun."

And in the words of third grade teacher Mrs. Christine Murphy, students are learning because they are being taught to "think metrics."

In another third grade class, Miss Marion Reardon puts this axiom into practice through a game she conducts with her students.

Each student closes his eyes and tries to approximate the distance of various metric measurements with his hands. First centimeters, then meters, and so on. Miss Reardon moves around the class to check which student has come closest to the exact measurement.

Some children have reported to her that when they tried to play the game at home they couldn't because their parents did not understand.

Actually metrics is not complicated or mysterious.

Devised by a group of French scientists in 1790, the metric system's basic unit of measurement is the meter, which is about three inches longer than a yard. From there, the system progresses by units of 10.

Going up, it takes 10 meters to make a decameter, and 10 decameters to make a hecameter. Finally, it takes 10 hecameters to make a kilometer.

Going down, a meter can be divided into 100 centimeters, which in turn can be broken down to 1000 millimeters. Or in simple decimals, a millimeter equals .001, a centimeter .01, a meter 1, a decameter 10, a hecameter 100, and a kilometer 1000.

When compared with the old English system, one can see how much easier and more logical this is. Instead of dividing by 12 to convert inches to feet, or dividing by 3 to convert feet to yards, one merely has to remember to divide and multiply by 10.

Thus instead of hassling with inches and feet, when third graders Lorraine Byne and Caroline Ross measure each other, they simply use centimeters, finding out that Lorraine, at 48½ centimeters, is one and a half centimers taller than her friend.

Another third grader towers over the girls at 57 centimeters.

In other activities Douglass Colwell discovers that his hand measures five centimeters while Vincent Ross's is five and a half. Later Vincent's smile measures seven centimeters.

The students do the same with volumes and weights. Fifth grader Robert Glass weighed in at 44 kilograms. Two other students found out they drank 240 milligrams of milk each day at lunch. Another found out that he drank milligrams of juice each morning. And finally, John Flynn, chewing a wad of gum, reflected on the fact that the gum wrapper weighed two grams.

A P P E N D I X F

SAMPLE TEACHER AND STUDENT EVALUATIONS

EVALUATION

A. Teacher Evaluation

Name: Christine M. Murphy

School: Charles H. Taylor

Grade: 3

Product: Metric Delights V-3

Author:

Company: Math Master

1. Presentation

Excellent

2. Clarity

Excellent

3. Freedom from error

4. Stimulating approach

4-25

5. Grade level

1-3

6. terest level

1-3 or 2 1 2 4

7. Type of paper

8. Print - type and size

9. Filmstrip or film - clear

Very well done

10. Illustrations:
    a. Pertinent Yes

    b. Distracting No

    c. Attention getting Yes

    d. Exaggerated No

    e. Overdrawn No

11. Program -

    a. Individualized No

    b. Upper level

    c. Average Yes

    d. Low

    e. General use Yes

12. Kits -

    Material included -
    Manipulative

13. Would you like to have this material?

Yes it was very helpful.

EVALUATION

A. Teacher Evaluation

Name: Donna Nelson

School: C H Taylor

Grade: 5

Product: Cambridge Mathematics

Author: Kline

Company: Cambridge Text Book Company

1. Presentation Excellent

2. Clarity - Very clear

3. Freedom from error - Yes

4. Stimulating approach - Yes

5. Grade level - 5

6. Interest level - May be used at higher grade levels as well as 5

7. Type of paper - Excellent

8. Print - type and size Very good

9. Filmstrip or film - clear

10. Illustrations:
    a. Pertinent - Yes
    b. Distracting - No
    c. Attention getting - Yes
    d. Exaggerated No
    e. Overdrawn No

11. Program -
    a. Individualized - Provision is made for child to progress at his level.
    b. Upper level
    c. Average Accommodates all three
    d. Low
    e. General use Yes

12. Kits -

    Material included -
    Manipulative

13. Would you like to have this material?

Very much. Cross references are made so that extra drill may be given to those who need it.

EVALUATION

A. Teacher Evaluation

Name: Ruth Brown

School: Charles H. Taylor

Grade: 4

Product: Workbook - Measure Metric Book A and B

Author: Lola J. May + Donna Cyrier Jacobs

Company: Harcourt Brace Jovanovich, Inc

1. Presentation

Good

2. Clarity

Clear

3. Freedom from error

yes

4. Stimulating approach

Good

5. Grade level

6. Interest level

Good

7. Type of paper

white with illustrations

8. Print - type and size

Very Good

9. Filmstrip or film - clear
none

10. Illustrations:
a. Pertinent yes

b. Distracting no

c. Attention getting yes

d. Exaggerated no

e. Overdrawn no

11. Program -

a. Individualized could be

b. Upper level yes

c. Average yes

d. Low yes

e. General use yes

12. Kits -

Material included -
Manipulative

13. Would you like to have this material?
yes

EVALUATION

A. Teacher Evaluation

Name: William J. Murphy

School: Charles H. Taylor

Grade: 4

Product: The Metric World

Author:

Company: Coronet Instructional Media

1. Presentation

Coronet Sound Film Strips
Very good

2. Clarity

Good

3. Freedom from error

Yes

4. Stimulating approach

Very

5. Grade level

4-8

6. Interest level

4-8

7. Type of paper

8. Print - type and size

9. Filmstrip or film - clear

Very well done

10. Illustrations:
    a. Pertinent — Yes
    b. Distracting — No
    c. Attention getting — Yes
    d. Exaggerated — No
    e. Overdrawn — No

11. Program -
    a. Individualized — Yes
    b. Upper level
    c. Average — Presentation average but can be adapted
    d. Low
    e. General use — Yes

12. Kits -

    Material included -
    Manipulative

13. Would you like to have this material?

Yes

EVALUATION

A. Teacher Evaluation

Name: Rosalind Ferrante

School: Charles H Taylor

Grade: 2

Product: "Mr Nimbergh in Metric Land"

Author: Ruth White

Company: Educational Products, Inc

1. Presentation

Excellent

2. Clarity

Very good

3. Freedom from error

Yes

4. Stimulating approach

Yes

5. Grade level

1-2-3

6. Interest level

1-2-3

7. Type of paper

8. Print - type and size

9. Filmstrip or film - clear

Very well done

10. Illustrations:
    a. Pertinent

    Very

    b. Distracting

    No

    c. Attention getting

    Very much so

    d. Exaggerated

    No

    e. Overdrawn

    No

11. Program -
    a. Individualized

    Teacher can adapt to need of class

    b. Upper level

    c. Average ✓

    d. Low

    e. General use

    Yes

12. Kits -

    Material included -
    Manipulative

13. Would you like to have this material?

Yes, indeed. These filmstrips are excellent.

EVALUATION

B. Student's Reaction

Student's Name Denise Lewis

School Charles H. Taylor

Grade 5

Product Let's Go Metric 1+2

Author

Company Cambridge Book Co

Did you like the film?

filmstrip? Yes

kit?

book?

workbook?

Why? Because it tells me a great deal about the metric system

Did you like the illustrations? Yes

Why? Because the pictures told me more.

Would you like to use this material? Yes

Did it help you? Yes

EVALUATION

B. Student's Reaction

Student's Name Marie Napier
School Charles H Taylor
Grade 4
Product Filmstrips/Cassettes
Author
Company Learning Resource Co

Did you like the film?

filmstrip? yes

kit?

book?

workbook?

Why? I like it because it helps me learn more about the basic facts of the metric system
Did you like the illustrations? yes
Why? They help me understand and they show me what to do.
Would you like to use this material? yes

Did it help you? yes

EVALUATION

B. Student's Reaction

Student's Name John Flynn
School Charles H. Taylor
Grade 4
Product Filmstrip plus Kit
Author Learning Resource Company
Company Imperial Film Inc

Did you like the film?

filmstrip? yes
kit? yes
book?
workbook?

Why? Because it told me a lot about the weight in the metric system
Did you like the illustrations? yes

Why? it was colorful and it made me understand more.
Would you like to use this material? yes

Did it help you? yes

A P P E N D I X G

LIST OF RECOMMENDED METRIC MATERIALS FOR THE ELEMENTARY SCHOOL

LIST OF RECOMMENDED METRIC MATERIALS FOR THE ELEMENTARY SCHOOL

Item	Source	Description	Grade level	Evaluation
Manipulative Kits				
1. Metric Kit A Metric Kit B	Addison-Wesley	Each kit contains concrete manipulatives to teach units of length, volume, temperature	1-3 4-6	1. Very good - Both kits provide "hands on" experiences. 2. Per pupil cost for 30 only $2.33
2. Working With Color Rods in Metric Measurement Unit I- Metric Length Unit II- Metric Area Unit III- Metric Volume	Cuisenaire Co.	Provides physical models which help the student to understand the metric system. Supplemental to any math system. Good for individualized or small group work	1-6	1. Excellent - Fulfills all criteria established 2. Cost for three kits $13.75 Shared cost by three classes $0.46 per pupil
3. Metric Multi-media Kits	Educational Teaching Aids Co.	3 Kits Kit A-length area Kit B-weight Kit C-liquid volume Meet criteria established	4-6	1. Excellent - Activity based;one form of measurement at a time 2. Cost - $1.42 per pupil

4. Metrikit	Math-Master	Provides all the tools to help children "think" metric. All manipulatives for teaching area, length, volume, weight. Small groups or individualized work	1-6	1. Excellent - meets all criteria 2. Cost per pupil only $5.33 and worth the price
5. Metric Lab	Math-Master	This kit is not as complete as the Metrikit. It does have many manipulatives, duplicating masters and a Telor for individualized work	3-6	1. Very good - Fulfills all criteria 2. Cost per pupil is only $4.17. Sharing on a grade level reduces the cost one-third
6. Metmak Kit	S.R.A. Associates	Individualized, self-pacing method of teaching and learning. Challenging and motivating. Similar to S.R.A. Reading Kit	4-6	1. Excellent - Well prepared by experts 2. Cost per pupil is only $2.82
7. Beginning Metric Measurement Learning Module	Society for Visual Education	Kit with all types of manipulative objects, plus 6 color sound filmstrips to teach basic concepts of the Metric System for those who have had no metric training	1-3 1-6	1. Excellent - Meets all criteria 2. Cost per pupil based on 30 per class-$4.48 If shared by 3 classes $1.50 per pupil

Filmstrips and Cassettes

1. Let's Go Metric I	Cambridge Book Co. (New York Times)	Three cassettes and six filmstrips-give history of Metric System, explain units of length, and mass	K-6	1. Excellent - Meets all criteria 2. Cost per pupil $2.50
2. Let's Go Metric II	Cambridge Book Co. (New York Times)	4 sound filmstrips and 2 cassettes review Metric I and develop volume	4-6	1. Excellent - Meets all criteria 2. Cost per pupil $1.90
3. Let's Learn About The Metric System	C.W.Clark Co.,Inc.	One filmstrip and a cassette. Excellent metric songs	K-3	1. Very good for primary children 2. Cost per pupil based on 30 per class - $0.43
4. Let's Talk Metric	C.W.Clark Co.,Inc.	Two sound filmstrips, 2 cassettes, 12 transparencies and spirit masters. Complete and more sophisticated presentation of S.I.	4-6	1. Very good presentation for more sophisticated upper elementary grades 2. Per pupil cost only $1.22

5. Meter, Liter, and Gram Fun	C.W.Clark Co.,Inc.	Developed by an expert teacher. Cassettes and filmstrips. Very appealing to children	1-5	1. Excellent - Meets all criteria 2. Cost per pupil is $2.53
6. The Metric System	Creative Learning Center	4 color filmstrips - 4 cassettes to teach meter, centimeter, liter and kilogram. Developed by an expert elementary teacher. Delightful, stimulating program	1-4	1. Very good - enjoyed by children. Portrays real people and familiar things 2. Per pupil cost is $2.65 and worth it
7. The Adventures of Mr. Windbag In Metric Land	Educational Products, Inc.	3 sound filmstrips with student sound sheets, presided over by a comical but lovable character, named Mr. Windbag. Filled with fun, music, and sound	1-3	1. Excellent - informative, appealing, delightful for primary classes 2. Cost per child $2.50 - lower when shared and stored in a Resource Room
8. Think Metric	Educational Products, Inc.	2 sound filmstrips and activity to help students. Presents basic units of measurements, shows use of S.I. in our every day lives	4-8	1. Excellent - material prepared by an expert on S.I. 2. Cost per pupil $0.97 and very worthwhile

9. Learning to Measure In A Metric World	Eye Gate House	4 filmstrips, 2 cassettes for primary and intermediate topics "How Tall, How Far and How Fast?" "How Much Does It Hold?" "How Much Does It Weigh?" Fun angle is not emphasized but many students preferred this series	1-6	1. Rated excellent Fulfills most of the criteria 2. Per pupil is a cost of $1.30. Less if shared by grades
10. Thinking Metric	Eye Gate House	Set presents comparisons between English and metric systems but no conversion. Filmstrips and cassettes	4-6	1. Rated very good by students and teachers 2. Cost per pupil is $1.43
11. Metric System Teaching Tapes	Houghton Mifflin	6 cassettes, 6 packets of student worksheets, teacher's guide and binder Professionals prepared the tapes and worksheets on length, area, capacity and weight	3-8	1. Good metric teaching unit 2. Cost per pupil is $1.20
12. The Metric System of Measurement	Educational Development Corp. and Imperial Film Co.	4 full color filmstrips and cassettes. Good if the student has had preliminary lessons in S.I.	1-6	1. Emphasizes the actual use of metrics in everyday life 2. Cost $1.75 per pupil

13. The Metric System Teaching Tapes	Houghton-Mifflin Co.	6 cassettes, 6 packets of student activity sheets, guide and binder. Provides for independent work plus group work. Simple, easy-going style	3-8	1. Very good - Developed by a professional in elementary education 2. Cost per pupil based on (30) is $1.20 per pupil
14. Using The Metric System	Knowledge Aid	6 sound filmstrips. Series of stories through which children learn problem-solving techniques and S.I. at the same time	1-6	1. Rated good by the faculty 2. Cost per pupil is $2.52
15. Metric Delights	Math-Master	Imaginative stories using cassettes and worksheets to develop step by step experiences using meter, centimeter, kilogram	1-3	1. Excellent - Innovative series. Meets the criteria 2. Cost per pupil is $2.83
16. Stories to Help You Think Metric	Math-Master	Filmstrips and cassettes developing linear and square measure, volume, mass, and temperature. Illustrations excellent and appealing to children. Imaginative, stimulating titles	4-6	1. Excellent series developed by two experts in the field of metrication. A clever presentation 2. Cost per pupil is $5.52. Remember, if shared the cost is reduced

17. Understanding The Metric System	Nystrom-Clearvue, Inc.	4 filmstrips, 2 cassettes. Titles "What Is Measurement?" "Let's Look At Length", etc. Each filmstrip handles one phase of the metric system.	3-6	1. Excellent series but there should be preliminary introduction into the metric system 2. Cost per pupil $1.35
Duplicating Masters				
1. Set A 2. Set B 3. Set C	Addison-Wesley	Very fine sets of duplicating masters. Each set presents in simple fashion all units child will need for everyday use.	1-2 3-4 5-6	1. Very good - meets the criteria accepted 2. Cost per pupil is $1.35
4. Metrication Masters	Holt, Rinehart & Winston	A complete course in metrication. Masters introduce S.I. in sequential order but need not be introduced in order. The lessons cover all basic units.	1-8	1. Excellent - supports all criteria established. Teachers rate series excellent because they can adapt to their own needs. 2. Cost per pupil $0.67 (50 masters)
Worktexts - Activity Books				
1. The Metric System	Addison-Wesley	The worktexts do not follow any particular math system. They function as supplementary materials. Can be used independently with any system.	4-5-6	1. Very good - 2. Per pupil cost, including Teacher edition is $1.97

2. Beginning Metrics	Golden Press	Good introduction to the Metric System. Clear, concise explanations.	1-2	1. Very good for primary 2. Cost per pupil is $0.74
3. Exploring The Metric System - Meter, Gram, Liter	Random-House	Booklets for each grade prepared by an expert in the elementary field. Provides for different levels of ability.	3-8	1. Very good series 2. Cost per pupil $1.49
Textbooks				
1. The Cambridge Mathematic Program	Cambridge Book Co.	Metric information is provided on each grade level and reinforced on the next.	1-6	1. Excellent series both for basic mathematical skills and for metric information. 2. Costs vary according to level: Grades 1-2 $2.08 Grades 4-6 $2.67
2. Holt School Mathematics Program	Holt, Rinehart & Winston, Inc.	Series includes texts, workbooks, transparencies, visuals, filmstrips, and manuals. Excellent math series with a step by step development of metric information. Very up-to-date information. Motivation excellent. Supplemental materials provide reinforcement and incentives.	1-6	1. Excellent presentation of S.I. and other math skills. Adheres to the criteria established. 2. Cost per pupil: Books 1-2 $2.64 Books 3-6 $4.71 Series is far ahead of most math systems

3. S.R.A. Mathematics System	Science Research Associates	This system teaches the Metric System as a separate strand, reinforced on each grade level.	1-6	1. Excellent series Develops individual potential 2. Cost per pupil Grades 1-3 $2.54 Grades 4-6 $4.95
4. School Mathematics: Concepts and Skills for Individual Achievement	Houghton-Mifflin	Typical math textbook but metric was very well presented.	1-6	1. Very good - 2. Books 1-2 per pupil cost is $2.95 Book 3 - $4.86 Book 4-5 - $4.92 Supplementary materials. $0.18 - $0.25 based on 90 pupils
5. Elementary Mathematics System	D.C.Heath	Children are exposed to a comprehensive treatment of metric measurement.	1-6	1. Very good 2. Cost per pupil Grades 1-2 $2.87 Grades 3-6 $4.90
6. D. C. Heath Elementary Mathematics Program	D.C.Heath	Comprehensive treatment of metric measurement beginning on Level 1.	1-5	1. Good - Achieves most of the criteria. 2. Cost per pupil: Grades 1-2 - $2.87 Grades 3-6 - $4.90

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A. Textbooks

Addison-Wesley Co. Copyright 1973
Eicholz et al
Investigating School Mathematics

American Book Co. Copyright 1972-73
Kane et al
Mathematics Target System

Cambridge Book Co. Copyright 1975
Kline
Cambridge Mathematics Program

Ginn & Co. Copyright 1970-72
Glennon et al
Essential Modern Mathematics (for the Slow Learner)

Ginn & Co. Copyright 1975
Scott et al
Ginn Mathematics: An Applied Approach

Harcourt Brace & Jovanovich Copyright 1972
Payne et al
Harbrace Mathematics

D. C. Heath Co. Copyright 1975
Dilley et al
Heath Elementary Mathematics Program

Holt, Rinehart & Winston, Inc. Copyright 1974
Nichols
Holt School Mathematics Program

Houghton Mifflin Co. Copyright 1975
Duncan et al
School Mathematics: Concepts And Skills

Houghton Mifflin Co. Copyright 1974
Denholm et al
Mathematics For Individual Achievement

Laidlaw Bros. Copyright 1972-73
Gundlach et al
Understanding Mathematics Program

MacMillan Co. Copyright 1970-71
Phillips
Developing Mathematics Series

Prentice-Hall, Inc. Copyright 1974
Rucker et al
Field Mathematics Program

Rand McNally/Lyons & Carnahan Copyright 1974
Kramer et al
School Math

Random House, Inc. Copyright 1972
Suppes et al
Random House Mathematics Series

William H. Sadlier, Inc. Copyright 1974
Bezuske et al
Sadlier Mathematics Program (for average & above)

William H. Sadlier, Inc. Copyright 1974
Grossman et al
Mastering Mathematics

Science Research Associates Copyright 1974
DeVault et al
SRA Mathematics Learning System

Scott Foresman Co. Copyright 1975
Bolster et al
Mathematics Around Us: Sills And Applications

Silver Burdett Copyright 1973
LeBlanc et al
Silver Burdett Mathematics System
(Science)

Houghton Mifflin Co. Copyright 1974
Berger et al
Modular Activities Program In Science (M.A.P.S.)

Silver Burdett Co. Copyright 1975
Mallinson et al
Understanding Your Environment

Silver Burdett Co. Copyright 1975
Vogeli
Metric Skills (spirit masters)
Level Three
Level Four
Level Five

B. Kits - Manipulative Items

Addison-Wesley Co.

Metric Kits

Metric Kit A - (Primary 1 - 3)	$69.95
Metric Kit B - (Elementary 4 - 6)	69.95

Cuisenaire Company of America, Inc.

Working with Color Rods in Metric Measurement
Cech, Joseph P. -- Seltzer, Carl H.

I - Metric Length	$ 6.50
II - Metric Area	6.50
III - Metric Volume	5.50
All three units	$ 13.75

Educational Teaching Aids

Metric Multimedia Kits -- Weber, Costello

Kit A - Measuring Length & Area	$ 14.95
Kit B - Measuring Weight	14.95
Kit C - Measuring Liquid Volume	14.95
Metric Multimedia Kits - Set of three above	$ 42.50

Math-Master

Metrikit (3 - 6)	$175.00
Metric Lab (3 - 6)	124.95

Charles E. Merrill Publishing Co.

Metrikit - Francis T. Spanga (3 - 6)	$ 49.95

Science Research Associates, Inc.

Metmak Kit - No. 03400020	$ 84.50

Singer/Society For Visual Education - Singer/S.V.C.

Beginning Metric Measurement - Learning Module (Primary)	$134.50

Instructor Publications, Inc.

The Metric System	$ 3.00

C. Filmstrips - Cassettes

BFA Educational Media

Introducing the Metric System
4 filmstrips, 4 cassettes, set of task cards
V T 9-605-5A $66.00

Cambridge Book Company - New York Time Company

Let's Go Metric 1 - Sound filmstrips
3 cassettes
6 filmstrips K - 6 $75.00

Let's Go Metric 2 - Sound filmstrips
2 Cassettes
4 filmstrips 3 - 6 $57.00

Charles W. Clark Co., Inc.

Learning to Measure - Sound Filmstrip K - P
1 filmstrip
1 cassette
1 Teacher's Guide $15.00

Learning to Measure - Filmstrip P - I
4 filmstrips $26.00

Let's Go Metric Primary
6 filmstrips
3 cassettes
Guide $75.00

Let's Learn About the Metric System P.
1 filmstrip
1 Cassette $12.95

Let's Talk Metric I - J Filmstrip - Sound
2 filmstrips
2 cassettes
12 transparencies and spirit masters $36.50

Meter, Liter and Gram Fun K - P
4 filmstrips
4 cassettes
Duplicating Masters
Guide $75.95

Ready Go Metric K - P
2 filmstrips
2 cassettes
Guide $26.95

Creative Learning Center

The Metric System — Consultant - Audrey V. Buffington
4 filmstrips — 3 - 4
4 cassettes — $79.50

Educational Products Inc.

Mr. Windbag in Metric Land - Primary - White, Ruth
3 Sound filmstrips
Teacher's Guide
Duplicator student worksheets — $75.00

Think Metric — 4 - 8 & Remedial
2 full color sound filmstrips
2 cassettes
teacher's Guide — $29.00

Eye Gate House

Learning to Measure In A Metric World X 462 (P/I)
Why Do We Measure?
How Tall, How Far and How Fast?
How Much Can It Hold?
How Much Does It Weigh?
4 filmstrips
2 cassettes — $38.85

Thinking Metric X 463 (I/J)
Why Metric
Length, Width, Height and Speed
Volume and Capacity
Mass and Weight
4 filmstrips
2 cassettes — $42.85

Houghton Mifflin

Metric System Teaching Tapes - Duncan, Ernest R.
Grades 3-8
Complete Set - 6 cassettes
6 packets of 10 students worksheets
Teacher's Guide — $36.00

Imperial Film Company - Educational Development Corporation

The Metric System of Measurement - Primary-Intermediate
History of Measurement
Measuring Length
Measuring Weight
Measuring Volume
4 full color filmstrips
4 cassettes — $58.00

Knowledge Aid

Using the Metric System - Problem Solving/Computation
Primary/Intermediate
6 Sound filmstrips
1 Teacher's Guide with ready to use Student Activities
1 Scope & Sequence Charts $75.50

Math-Master Company

Metric Delights - Levels 1 - 3

Length - 3 cassettes; 3 worksheets	$21.90
Area - 3 cassettes; 3 worksheets	21.90
Mass (Weight) - 3 cassettes; 3 worksheets	21.90
Capacity - 3 cassettes; 3 worksheets	21.90

Complete Program
12 cassettes - 12 worksheets $84.95
100 worksheets of one kind 6.50

Stories to Help You Think Metric - Level 4-6
Linear Measure
4 filmstrips
4 cassettes
4 worksheets $56.20

Square Measure
3 filmstrips
3 cassettes
3 worksheets $42.15

Volume
3 filmstrips
3 cassettes
3 worksheets $42.15

Mass & Temperature
2 filmstrips
2 cassettes
2 worksheets $28.10

Complete Program $165.60
100 worksheets 6.50

Nystrom - Clearvue Inc.

English or Metric - That is the Question
4 filmstrips
2 cassettes Grades 7 - 8 $40.50

Nystrom - Clearvue, Inc.

Understanding the Metric System
4 filmstrips
2 cassettes
1. What is Measurement?
2. Let's Look at Length
3. Let's Look at Valume
4. Let's Look at Mass (Weight)
Lower to middle elem grades $40.50

Q & E. D. Productions

Primary Mathematics 2
An Introduction to Metric Measurement - Henry Palmer, Ph.D
5 filmstrips
Teacher's Manual
Student Activity Book (spirit duplicator masters)
5 cassettes $109.50

Sargent-Welch Scientific Co.

Measurements - Intermediate
Sound-filmstrip sets - color
a. Standards & Measurement
b. Measurement Systems and Theory
M3994Z-01-2 2 filmstrips
1 cassette $21.00

Think Metric - Grades 4 - 8
(Ann Edson, M.Ed. Allan A. Swartz, M.A.)
4 color filmstrips
4 cassettes $49.90

Metric System Skills - Grades 4-8
(Ann Edson, M.Ed. Allan A. Swartz, M.A.)
Set of 4 cassettes, guide $27.95

D. Duplicating Masters

Addison-Wesley Publishing Co.

Going Metric - James Sherrill & J.N.C. Sharp
Duplicator Masters (Set A)
32 Duplicating Masters Grades 1 & 2
Grade 3 - certain levels $ 7.50

Duplicator Masters (Set B) - Grades 3 & 4
40 Duplicating Masters $ 9.00

Duplicator Masters (Set C) Grades 5 & 6
40 Duplicating Masters $ 9.00

Charles W. Clark Co., Inc.

Duplicating Workbook - Metrics P - I
18 Spirit duplicating lessons for individual or group activity $ 3.95

Holt, Rinehardt and Winston, Inc.

Metrication Masters (Grades 1 - 8 - Non-graded
50 Masters $19.98

Instructor Curriculum Materials

The Metric System - Diane F. Rabena
Book 1 Grades 1-2 - 28 Duplicating Masters $ 3.75
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Book 3 Grades 5-6 - 28 Duplicating Masters $ 3.75

The Instructor Publications, Inc.

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20 Illustrated duplicating masters $ 4.25

Visual Materials Incorporated

Understanding the Metric System-Pat and Tom Heineman
12 color transparencies
14 Spirit Masters Grade 4 - 6 $ 6.95

E. Worktexts

Addison-Wesley Company

The Metric System Grades 4, 5, and 6
Pupil's text $ 1.50
Teacher's text $ 2.10

Golden Press

Golden Readiness Workbook Grades 1 - 3
Beginning Metrics - by Joanne Wylie $ .79

Laidlaw Brothers

Exploring the Metric System-Meter, Gram, Liter
Kampf, A. F. and Richards, T. J.
Grade 4 - 6 $ .66 per copy
Using the Metric System-Meter,Lites,Gram
Grades 7 - 12 $ .72 per copy

Random House

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Meters, Liters and Grams - Buffington, Audrey V.
Pupil's text $ 1.44
Teacher's Manual $ 1.50
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